What is claimed is:

1. A paint for forming a hardfacing surface on a metal substrate, comprising:

metallic hardfacing particles dispersed in water containing less than 10% by weight organic thickening agent;

wherein the metallic hardfacing particles are selected from the group consisting of: tungsten carbide, cobalt-bonded tungsten carbide, nickel-bonded tungsten carbide, chromium carbide, nickel-bonded chromium, cobalt-bonded chromium carbide, tantalum carbide, niobium carbide, vanadium carbide, and nickel-chrome hardfacing alloys containing boron or silicon for melting point reduction and iron, molybdenum, tungsten, manganese, carbon or combinations thereof for obtaining the desired mechanical properties, wherein said hard particles have a Rockwell C hardness greater than 50; and

wherein the viscosity of the paint is greater than 50,000 centipoises at 0.5 rpm as measured with a Brookfield viscometer, and the ratio of the viscosity measured at 0.5 rpm to the viscosity measured at 100rpm is greater than 20 to 1.

2. A paint as recited in claim 1, wherein the organic thickening agent is an acid containing cross-linked acrylic emulsion copolymer.

3. A paint as recited in claim 1, in which the mean size of the hard particles is greater than 30 microns.

4. A paint as recited in claim 1, wherein the hard particles are tungsten carbide.

5. A paint as recited in claim 1, wherein the mean size of the hard particles is less than 20 microns.

6. A paint as recited in claim 1, wherein the mean size of the hard particles is from 1 to 5000 microns.

7. A paint as recited in claim 1, in which large and small hard particles are present in the ratio of over 6 parts by weight large particles to less than 4 parts by weight small particles, and the ratio of the size of the large particles to that of the small particles is greater than 8 to 1.

8. A paint as recited in claim 1, in which the hard particles include particles sized larger than 1000 microns.

9. A paint as recited in claim 1, including an inorganic dispersant selected from the group: hydrated magnesium aluminum silicates, clays, water-swellable clays, organo clays, sodium silicate, and potassium silicate.

10. A paint as recited in claim 9, wherein the inorganic dispersant is colloidal magnesium aluminum silicate.

11 . A paint for use in hardfacing a metal substrate, comprising:

metallic hardfacing particles having a density of greater than 10 grams per cubic centimeter and a Vickers hardness of at least 1000 dispersed in water containing less than 10% by weight organic thickening agent.

12. A paint as recited in claim 11, wherein the viscosity of the paint is greater than 50,000 centipoises at 0.5 rpm as measured with a Brookfield viscometer, and the ratio of the viscosity measured at 0.5 rpm to the viscosity measured at 100 rpm is greater than 20 to 1.

13. A paint as recited in claim 11, wherein the thickening agent is an acid containing cross-linked acrylic emulsion copolymer.

14. A paint as recited in claim 11, wherein the paint also includes an inorganic dispersing agent in which the ratio of the volume of hard particles to inorganic dispersing agent is greater than 20 to 1.

15. A paint as recited in claim 12, wherein the thickening agent is an acid containing cross-linked acrylic emulsion copolymer.

16. A process for producing wear resistant coatings on the surface of a metal substrate, comprising the steps of:

a. first, applying a layer of paint having a dispersion of hard particles onto the surface;

b. then, placing over said paint layer a layer of braze alloy that in its molten state will wet the metal substrate and the hard particles;

c. then, heating said substrate and hard-particle paint layer and braze alloy layer to a temperature above the liquidus of the braze alloy but below the solidus of the substrate; and then

d. cooling the coated substrate to ambient temperature.

17. A process for producing wear-resistant coatings as recited in claim 16, in which the metal substrate is an alloy of iron, nickel, cobalt, aluminum, copper, or the refractory metals selected from the group consisting of tungsten, molybdenum, niobium, uranium, titanium, or zirconium.

18. A process for producing wear-resistant coatings as recited in claim 16, in which the hard particles are selected from the group consisting of: tungsten carbide, cobalt-bonded tungsten carbide, nickel-bonded tungsten carbide, chromium carbide, nickel-bonded chromium, cobalt-bonded chromium carbide, tantalum carbide, niobium carbide, and vanadium carbide.

19. A process for producing wear resistant coatings on the surface of a metal substrate, comprising the steps of:

a. first, applying a layer of paint having a dispersion of hard particles and braze particles onto the surface;

b. then, heating said substrate and paint layer and braze alloy layer to a temperature above the liquidus of the braze alloy but below the solidus of the substrate; and then

c. cooling the coated substrate to ambient temperature.

20. A process for producing wear resistant coatings on the surface of a metal substrate as recited in claim 19, wherein said hard particles are braze alloy particles including hard precipitates.

21. A process for producing wear resistant coatings on the surface of a metal substrate as recited in claim 19, wherein said hard particles are different from the braze particles.

22. A process for producing wear resistant coatings on the surface of a metal substrate as recited in claim 19, wherein said hard particles are different from the braze particles, and wherein said braze particles include hard precipitates.

23. A process for producing wear resistant coatings on the surface of a metal substrate, wherein said hard particles are taken from the group consisting of: tungsten carbide, cobalt-bonded tungsten carbide, nickel-bonded tungsten carbide, chromium carbide, nickel-bonded chromium, cobalt-bonded chromium carbide, tantalum carbide, niobium carbide, vanadium carbide, and nickel-chrome hardfacing alloys containing boron or silicon for melting point reduction and iron, molybdenum, tungsten, manganese, carbon or combinations thereof for obtaining the desired mechanical properties, wherein said hard particles have a Rockwell C hardness greater than 50;

24. A process for producing wear resistant coatings on a concave surface, comprising the steps of:

(a) applying a layer of wet adhesive to said concave surface,

(b) applying dry hard particles onto said wet adhesive layer to embed the hard particles into the wet adhesive layer,

(c) drying the adhesive with the imbedded hard particles,

(d) applying another layer of wet adhesive over the dried layer of hard particles,

(e) applying dry powdered braze alloy onto said other layer of wet adhesive to embed the braze alloy into the wet adhesive layer,

(f) drying the adhesive with imbedded braze alloy particles;

(g) heating said substrate with the layers of hard particles and the braze alloy to a temperature above the liquidus of the braze alloy but below the solidus of the substrate, and then

(h) cooling the coated substrate to ambient temperature.

25. A process as recited in claim 24, wherein the concave surface is an iron-base alloy fan blade.

26. A process as recited in claim 24, wherein the concave surface is the interior of a pipe.

27. A process as recited in claim 24, wherein the adhesive is applied to the interior of the pipe by spraying.

28. A process for producing coatings of hard particles on the surface of a substrate material, comprising the steps of:

(a) wetting the surface of the substrate material with a basic compound selected from the group consisting of hydroxides of alkali and alkaline earth metals,

amines, and ammonium hydroxide;

(b) submerging the wetted substrate into in a paint comprising over 15 volume percent hard particles dispersed in a paint containing an acid-containing thickening agent that had been partially neutralized by adjusting its acidity to a pH of less than 7 for sufficient time to allow the basic compound to diffuse into the paint to substantially increase its viscosity;

(c) removing the submerged substrate from the paint to form a layer of paint having a viscosity adjacent to the surface of the substrate substantially higher than the viscosity of the paint itself; and

(d) drying the paint to form a coating of particles on the substrate.

29. A process as recited in claim 28, in which the acid-containing thickening agent is an acid containing cross-linked acrylic emulsion copolymer.

30. A process for hardfacing metal surfaces, comprising the steps of:

(a) first, wetting the surface of the substrate metal with a basic compound selected from the group consisting of hydroxides of alkali and alkaline earth metals, amines, and ammonium hydroxide;

(b) then, submerging the wetted substrate into in a paint comprising over 15 volume percent of fusible metallic hardfacing particles dispersed in a paint containing an unneutralized acid-containing thickening agent, wherein the pH of the paint is less than pH 7, said fusible metallic hardfacing particles being selected from the group consisting of nickel, cobalt, or iron base hardfacing alloy, and mixtures of hard particles with braze alloys;

(c) then, allowing the substrate to be submerged for sufficient time to allow the basic compound to diffuse into the paint to substantially increase the paint's

viscosity;

(d) then, removing the submerged substrate from the paint to form a layer of paint in which the paint viscosity adjacent to the surface of the substrate is substantially higher than the viscosity of the paint alone;

(e) then, drying the paint to form a coating of particles on the substrate;

(f) then, heating the coated substrate in an inert atmosphere above the solidus of said hardfacing alloy or braze alloy to metallurgically bond the hardfacing particles to the metal substrate.

31. A process as recited in claim 30 in which the acid-containing thickening agent is an acid containing cross-linked acrylic emulsion copolymer.

32. A process for hardfacing sheet steel, comprising the steps of:

(a) moving a flat horizontal steel sheet beneath sprayers;

(b) spraying a layer of adhesive onto said steel sheet ;

(c) then spraying the desired amount of hard particle powder onto the layer of adhesive;

(d) then spraying adhesive over the hard particle powder;

(e) then spraying the desired amount of braze alloy powder over the adhesive;

(f) then moving the sheet through an open-ended hydrogen sintering furnace that melts the braze, thus forming a metallurgically bonded composite of hard particles and braze on the top surface of a steel sheet.

33. A process as recited in claim 32, wherein said steel is low carbon steel.

34. A process as recited in claim 33, and further comprising the step of passing the hardfaced sheet through straightening rolls.